



Lehman Review
June 5, 2002



DCS & Calibration/Monitoring

Jim Rohlf
Boston University

*D*etector *C*ontrol *S*ystem contributions by



S. Sergueev (All aspects)

J. Elias (Overall design)

D. Lazic (Testbeam, PVSS, doc., *etc.*)

S. Holm (RBX)

T. Kramer (PVSS, LV and HV)

V. Barnes, *et al.* (Source)

V. Hagopian *et al.* (Laser/LED)

C. Tully, *et al.* (Event Spy)

► <http://cmshcal.web.cern.ch/cmshcal/DCS>

HCAL DCS Components:



High Voltage (HPD, PMT)

Low Voltage & Temp. Monitor (FE)

Voltage, Current & Temp. Monitor (LV supplies)

FPGA Configuration (FE, HTR, DCC)

Charge Injection Calibration (com. and maintenance)

Laser Calibration (pulse once per month)

LED (diagnostic only)

Source Calibration (once per year)

Event Spy (continuous)

DCS: Control of HCAL Electronics

front end

HB 36 RBX (HPD+QIE)
 HE 36 RBX
 HO 36 RBX
 HF 24 3u crates (QIE) + 72 PMT boxes



digital

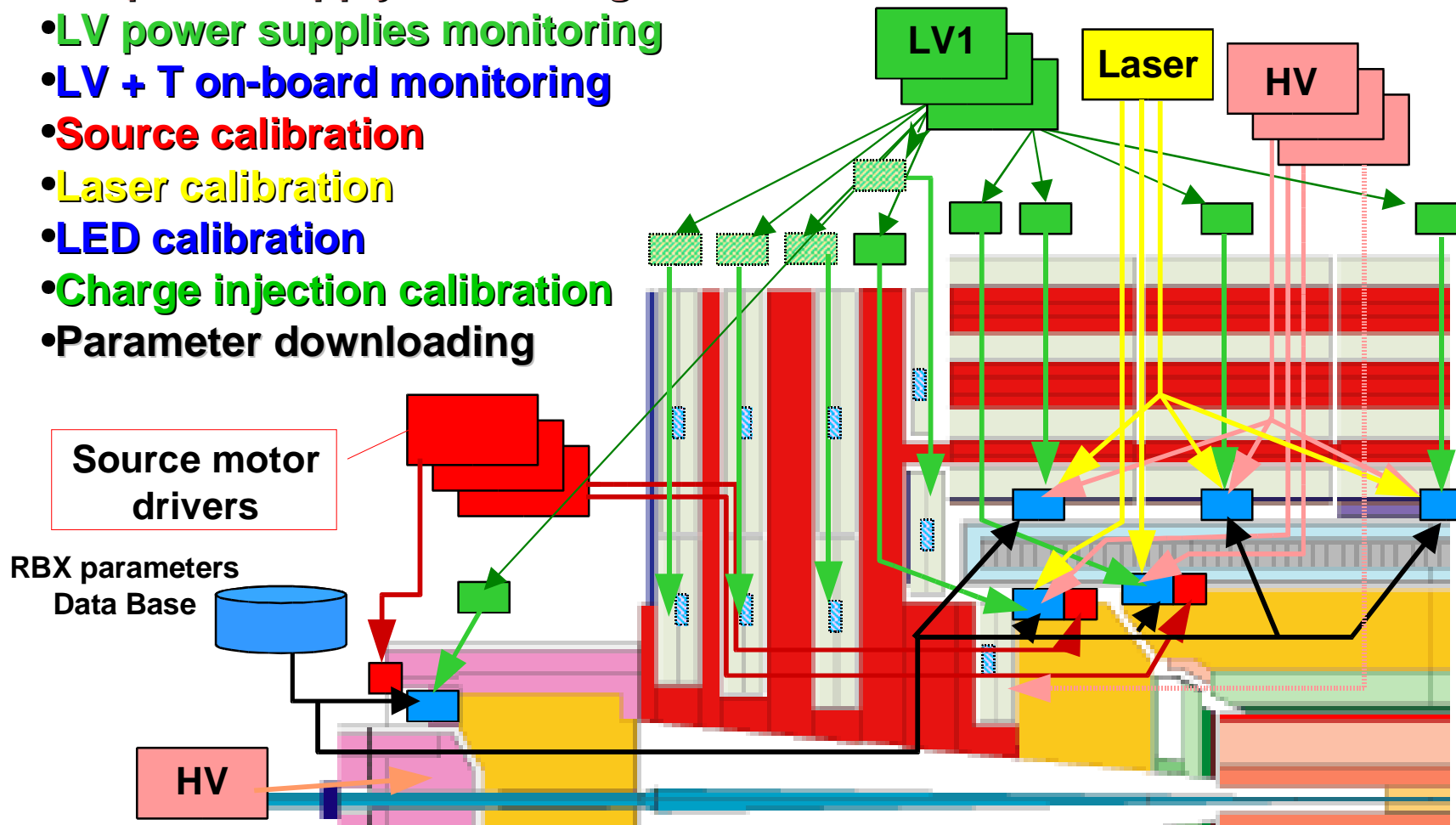
	channels	fibers	trig towers	SLB	HTR	crates	HTR/crate
HB (pure)	1728	576	1728	216	36	3	12
HB/HE overlap	1728	576	864	108	36	3	12
HE (pure)	1728	576	1440	180	36	3	12
HO	2160	720	*	*	48	4	12
HF	1728	576	144	18	38	3	12

TOTAL **9072** **3024** **4176** **522** **194** **16**

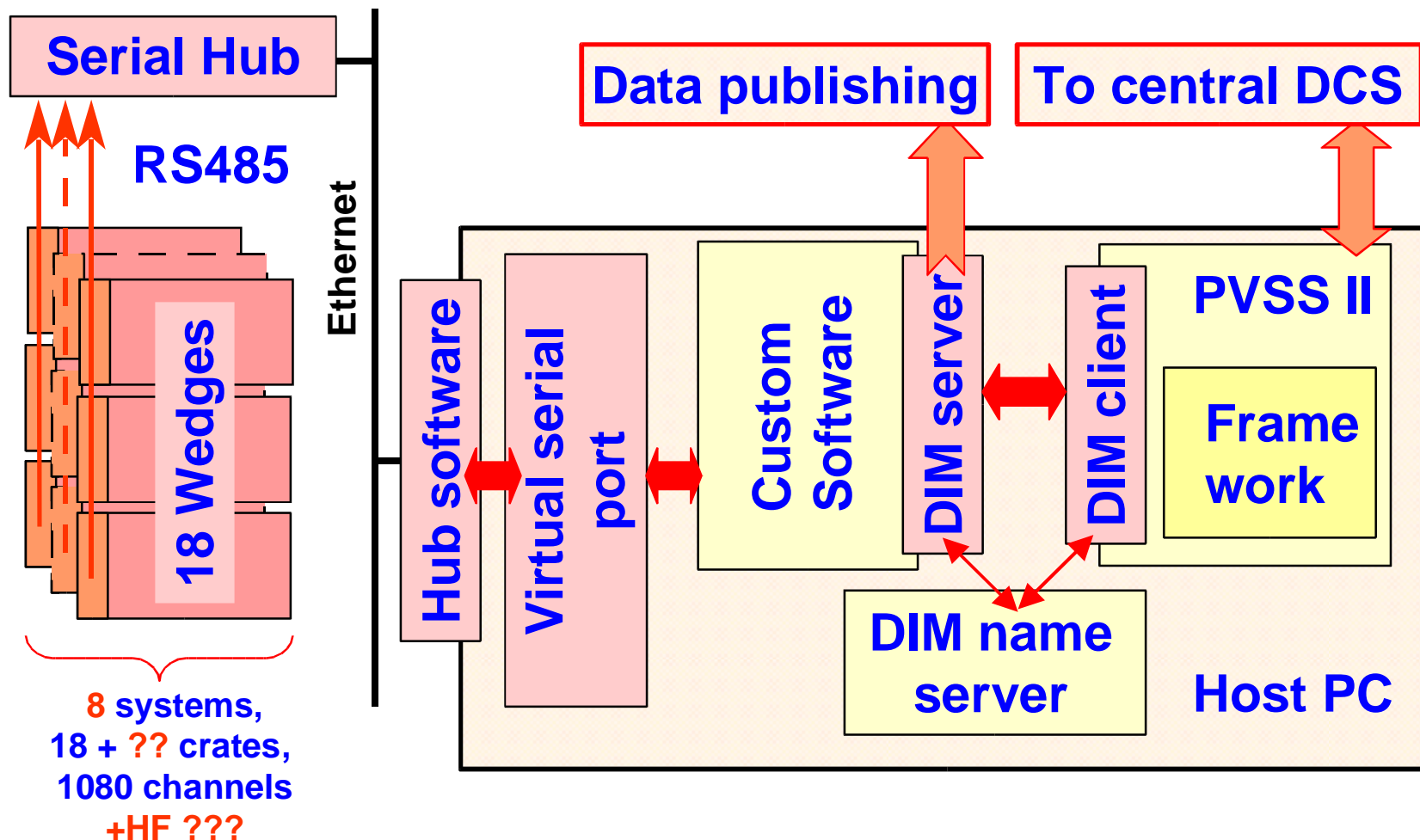
* Planning underway for inclusion in RPC trigger

HCAL DCS Infrastructure

- HV power supply monitoring
- LV power supplies monitoring
- LV + T on-board monitoring
- Source calibration
- Laser calibration
- LED calibration
- Charge injection calibration
- Parameter downloading

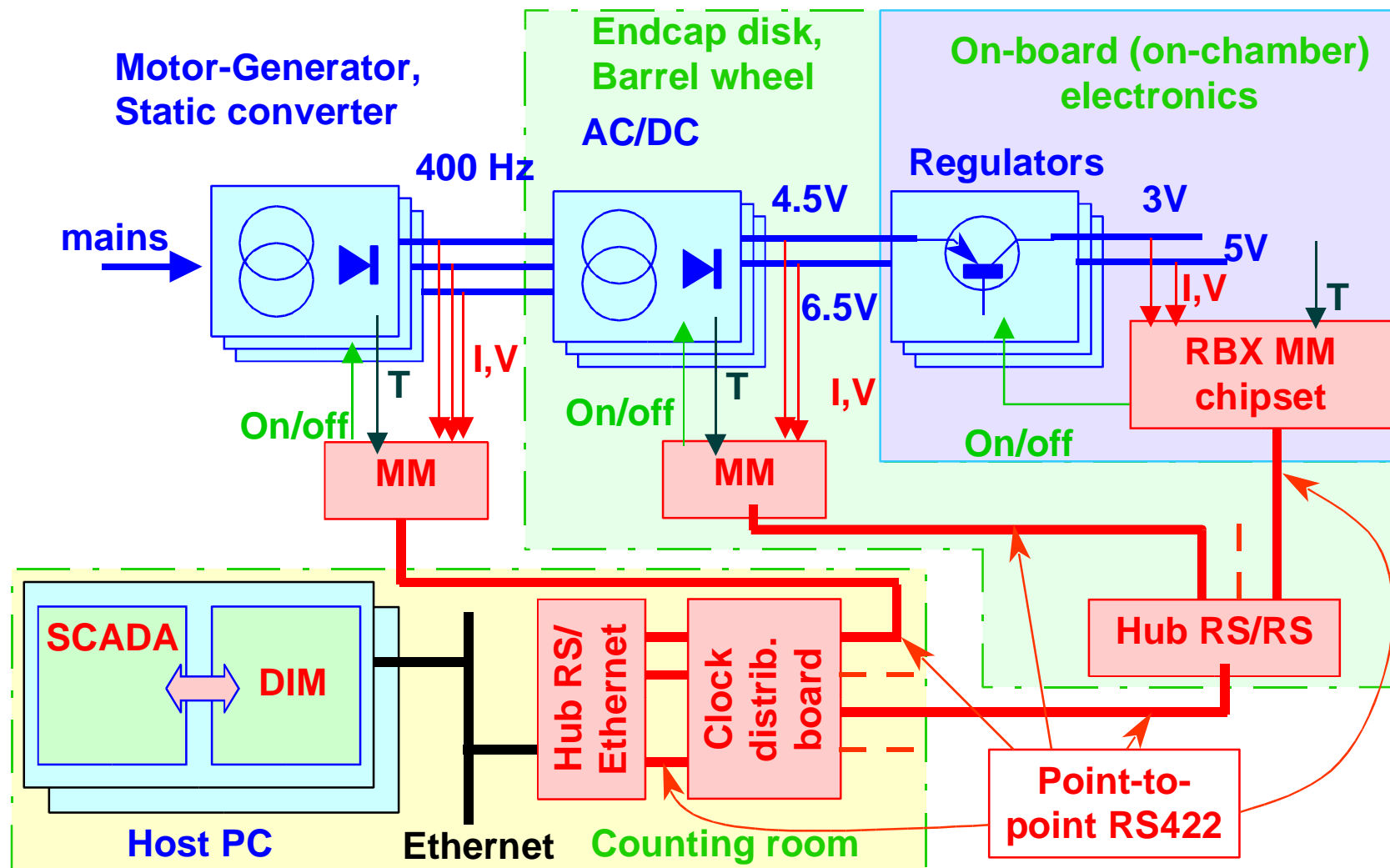


High Voltage Control System



HV server program complete, tested with EMU supply. To be used with HCAL supply this summer to control 2 wedges.

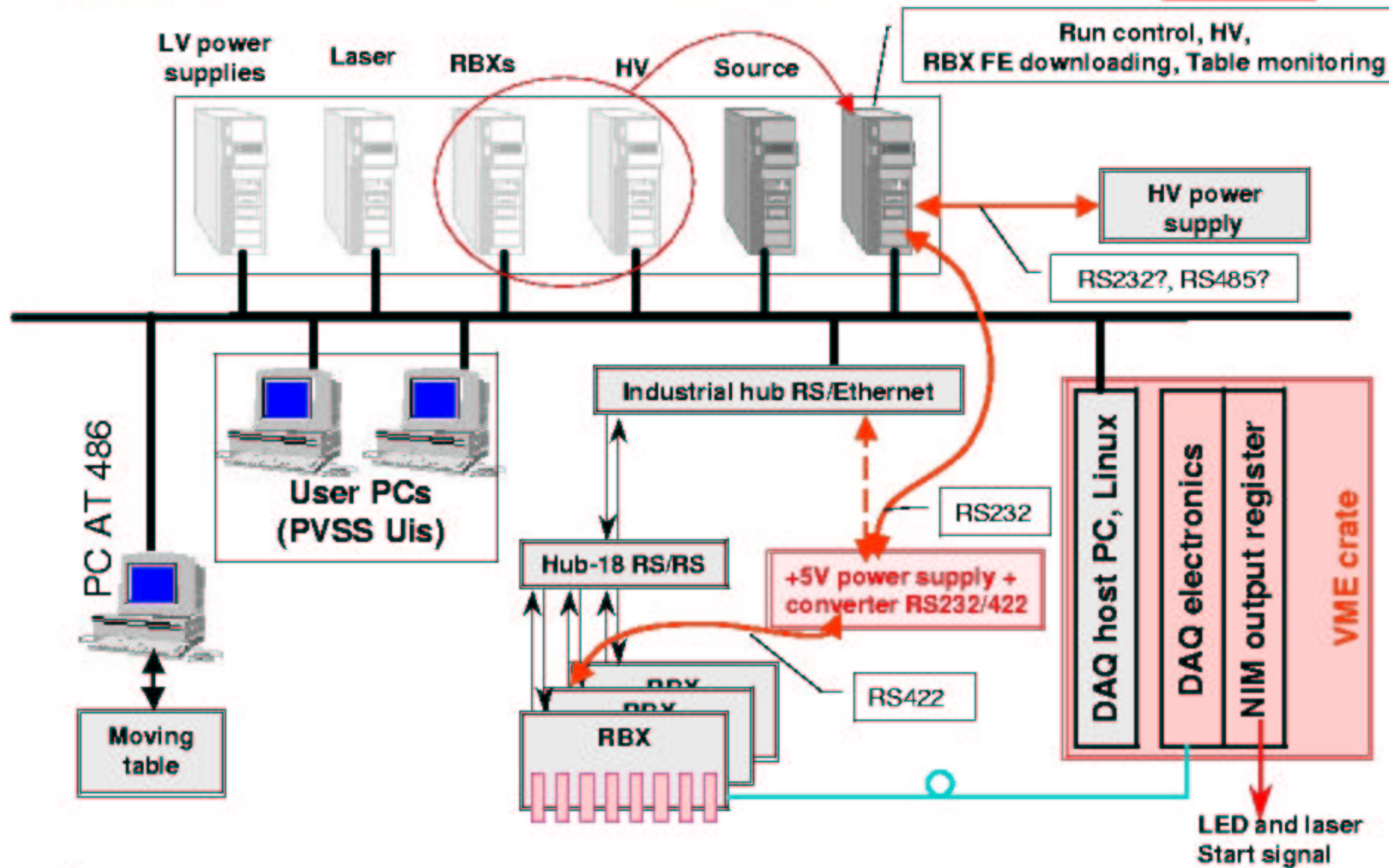
Low Voltage Control System



400 Hz AC chosen for CMS. The HCAL control system may be used in other subdetectors.

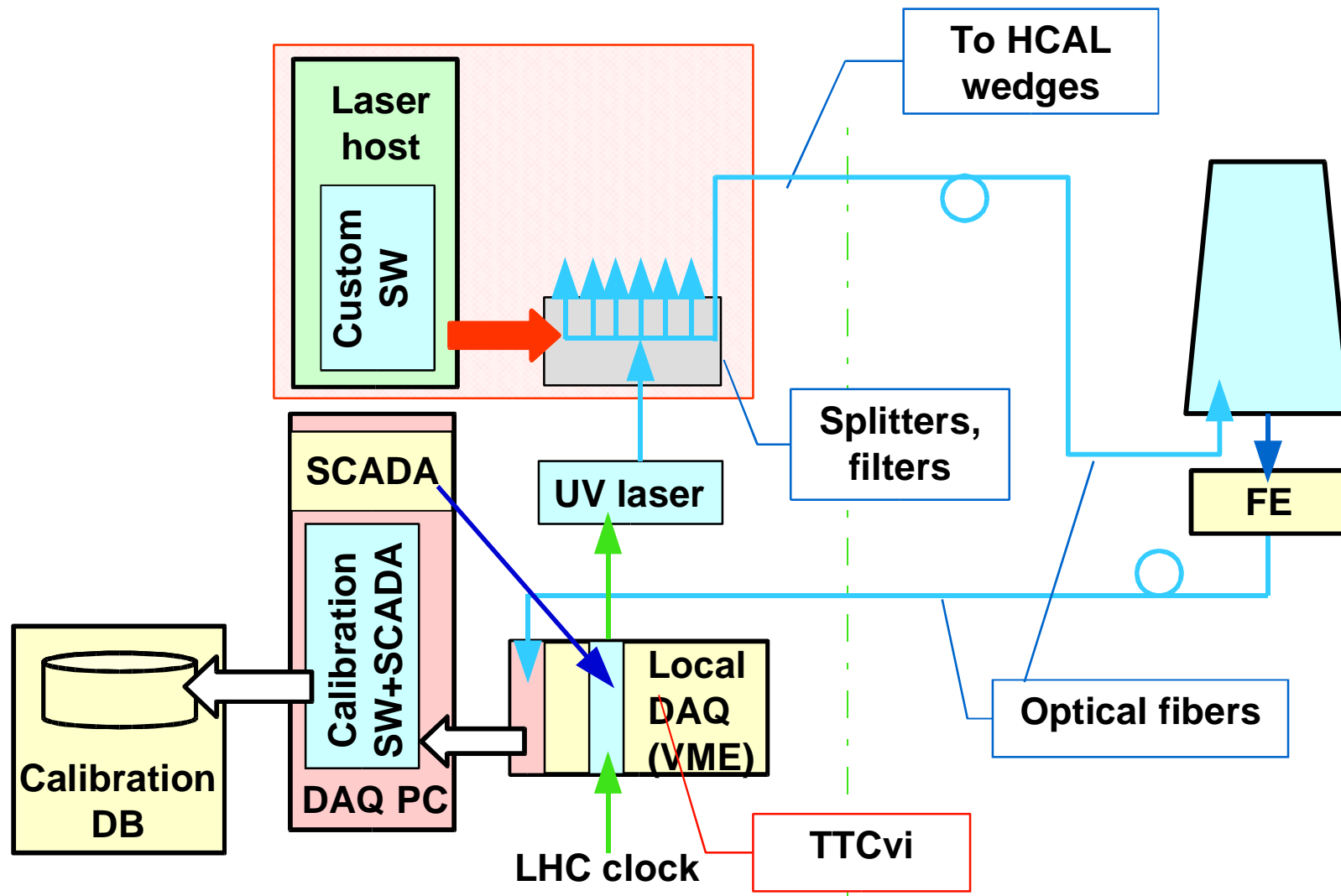


FE monitoring path 2002



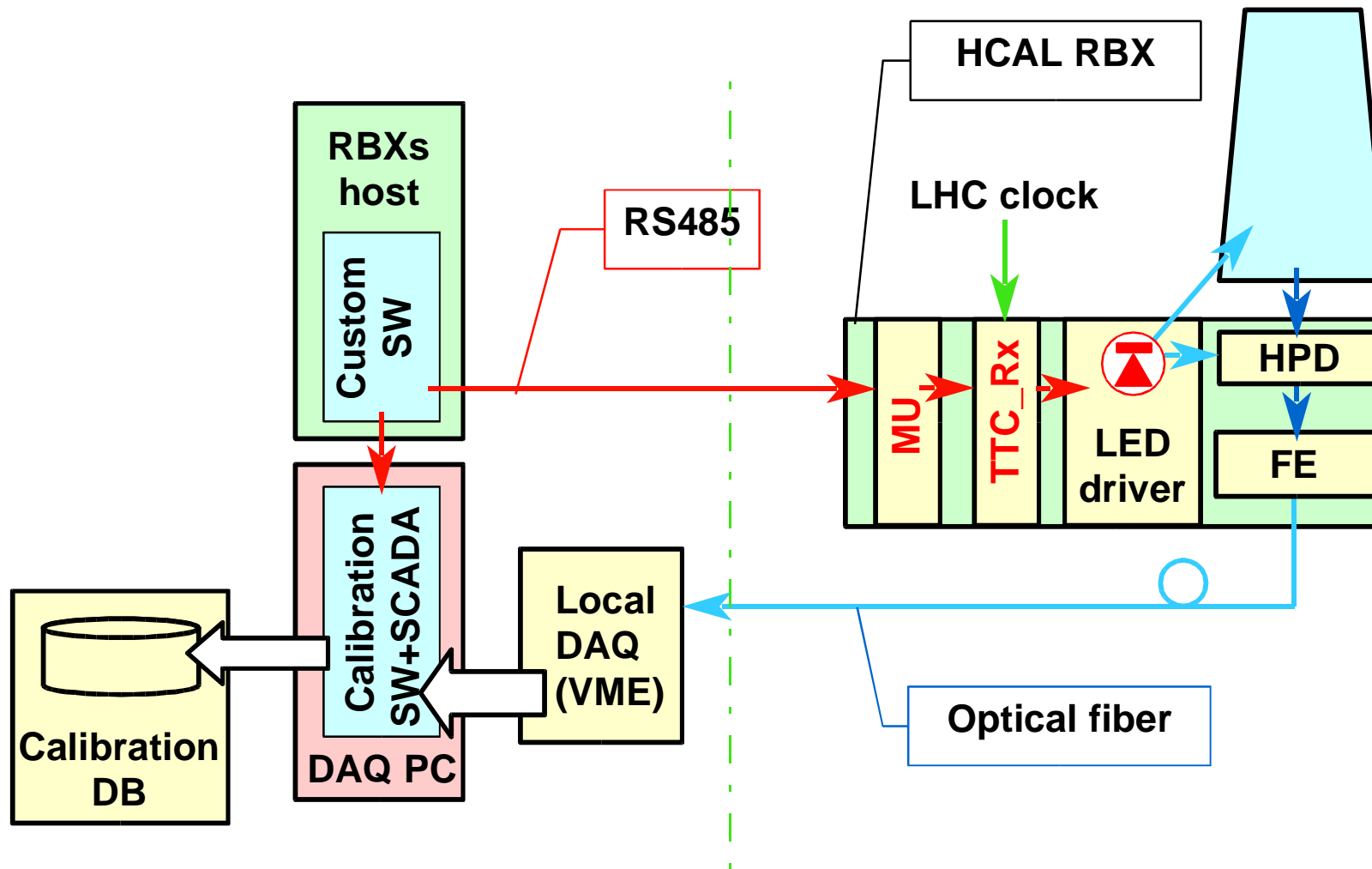
To be used in 2002 testbeam.

Laser Calibration

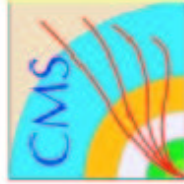


Stand alone system exists at FSU. Plan to integrate this Fall.

LED Calibration

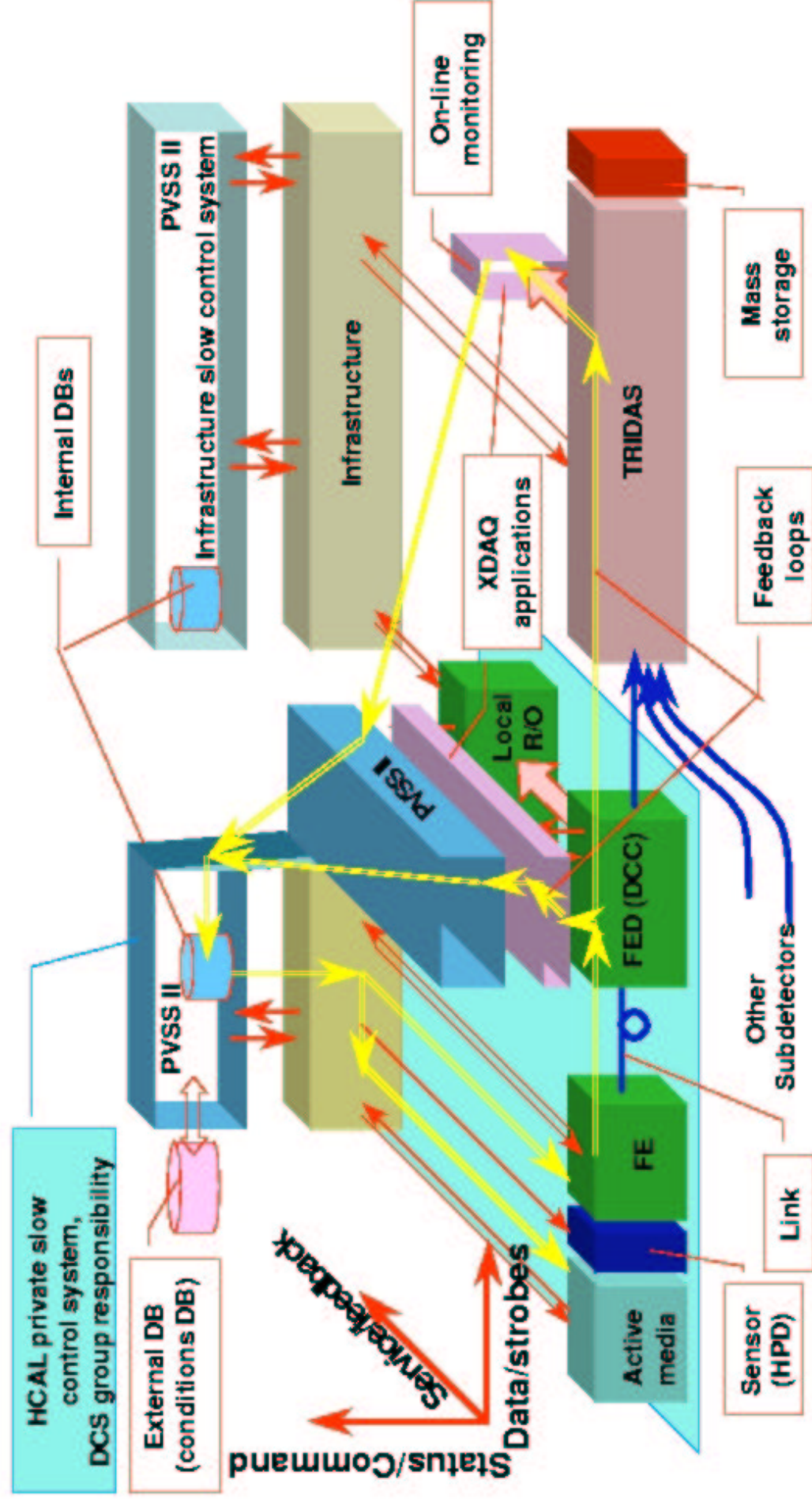


Stand alone system exists at FSU. Plan to integrate this Fall.



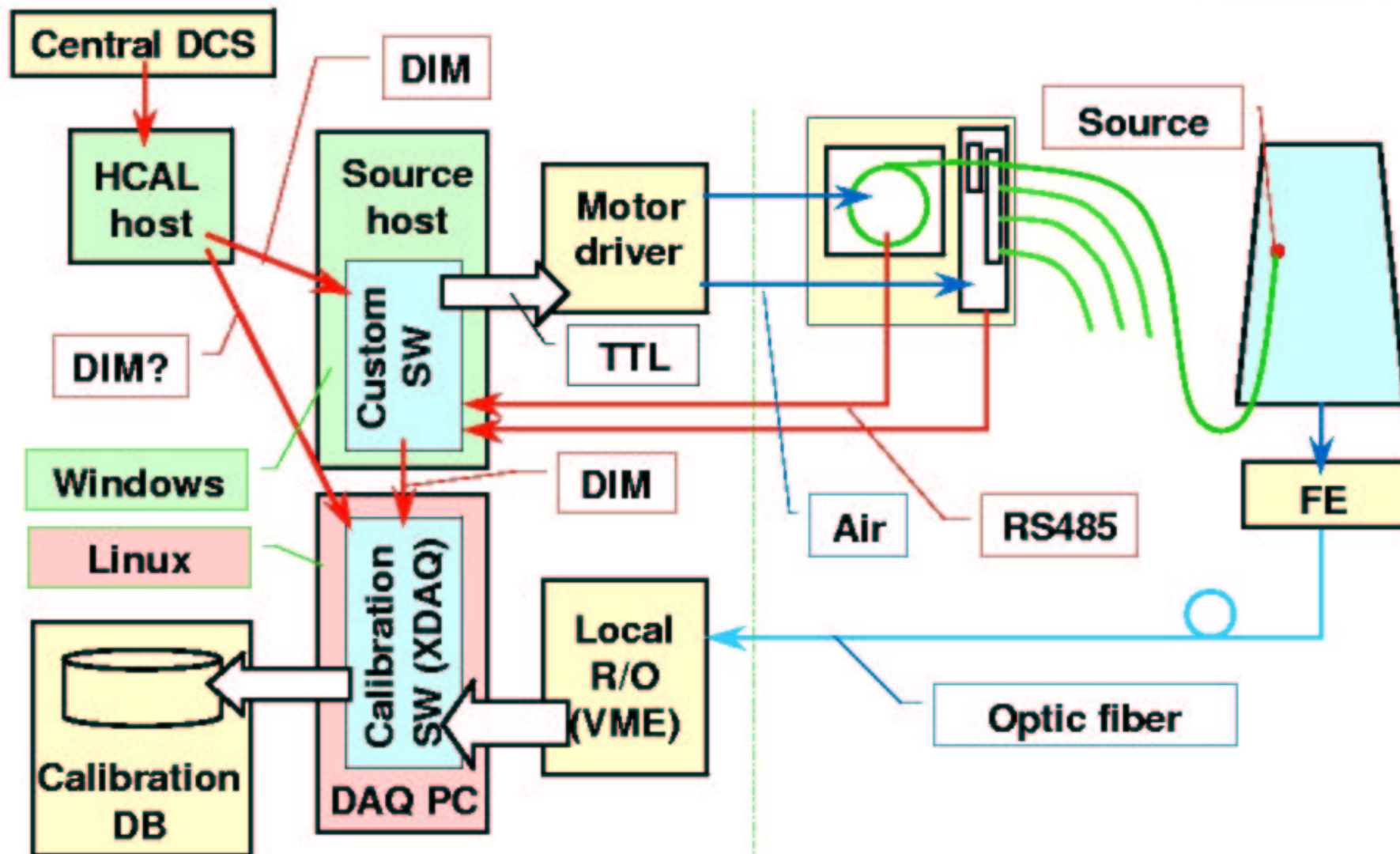
The future scheme

Communication XDAQ-PVSS is under discussion now



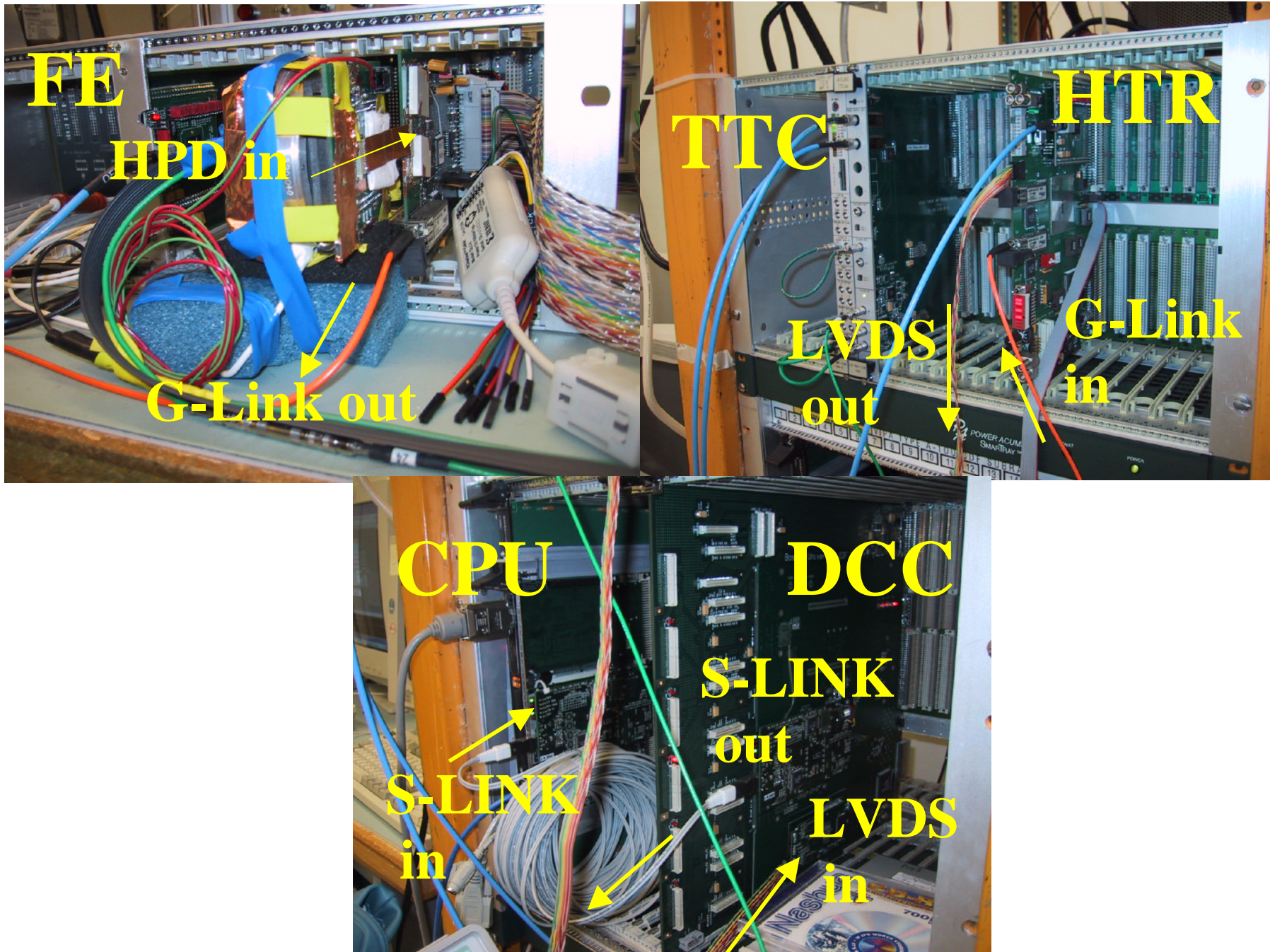


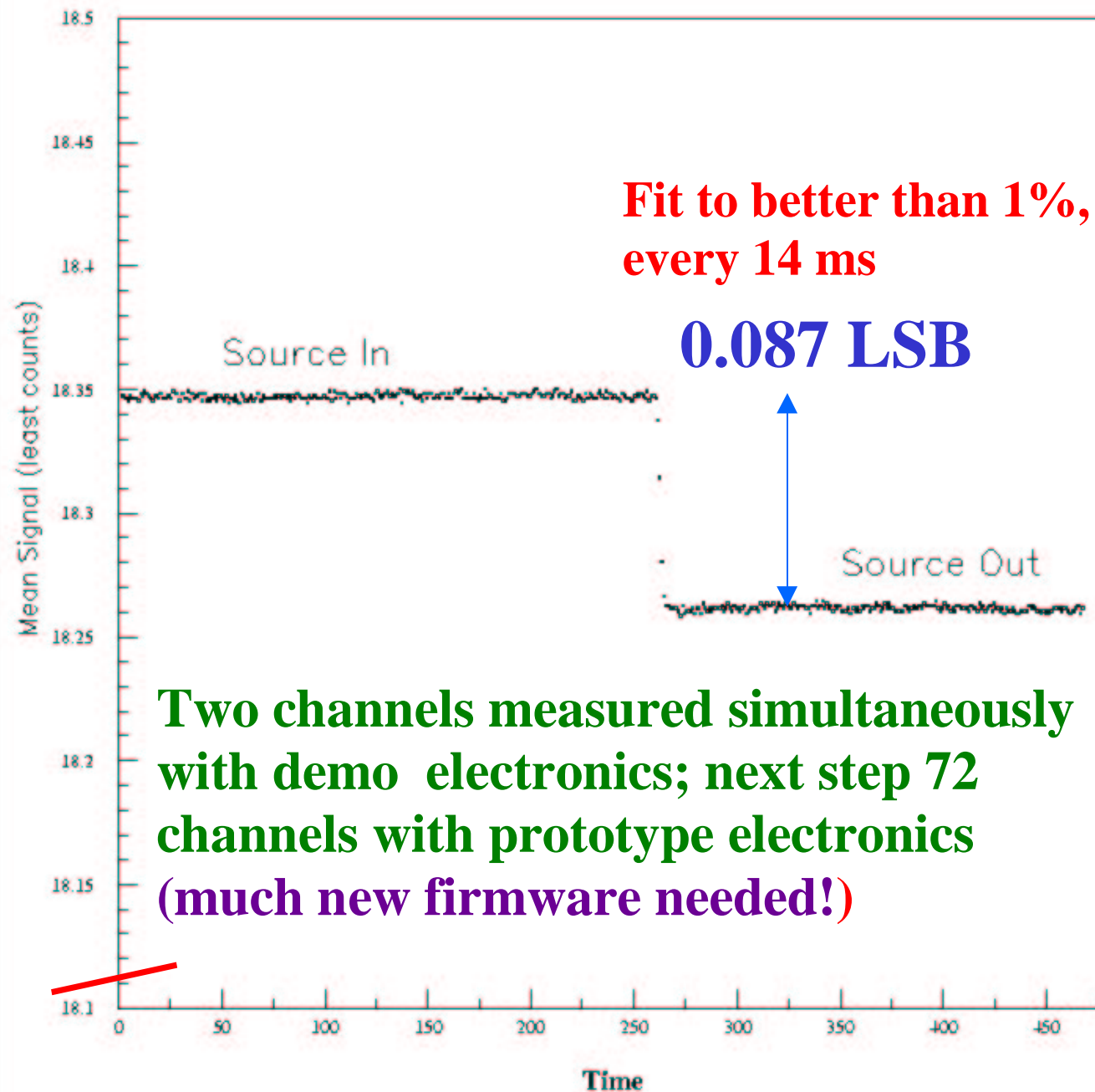
Radioactive source calibration



Two channels read out with fixed source. One full wedge to be read out this summer. Hardware at CERN.

HCAL Demonstrator/Source Test





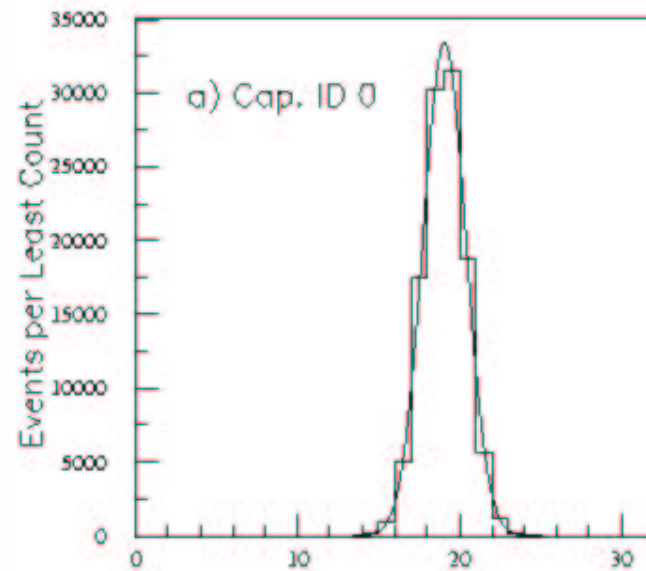
*Source Calibration,
Jan.-Mar. 2002*

Single QIE Channel, Pedestals from 4 Caps

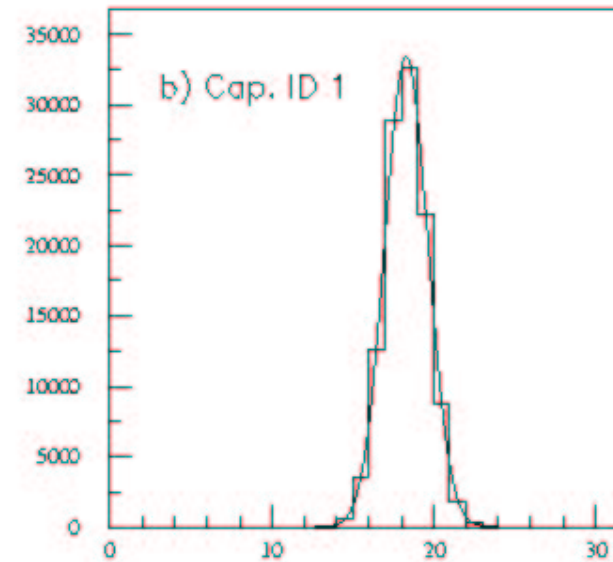
*Source Calibration,
Jan.-Mar. 2002*

2800 e rms noise

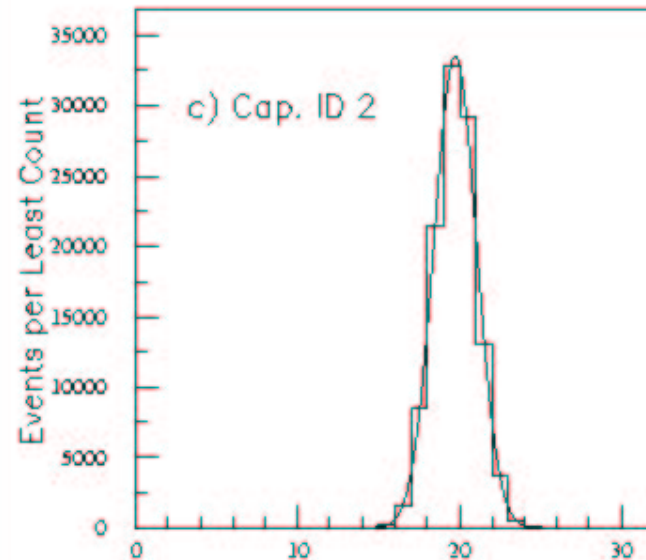
2002/03/15 12.35



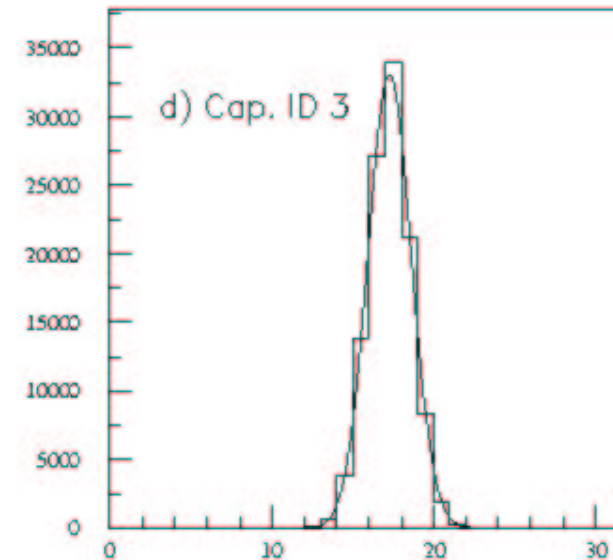
Pedestal (LC)



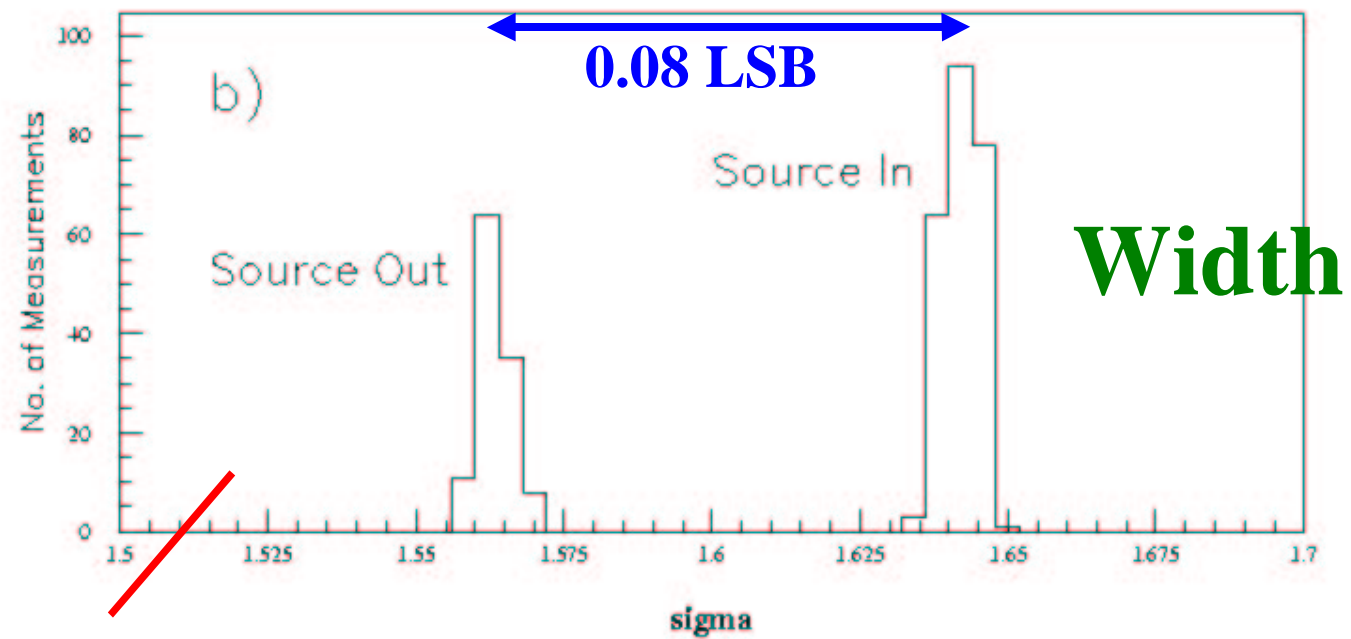
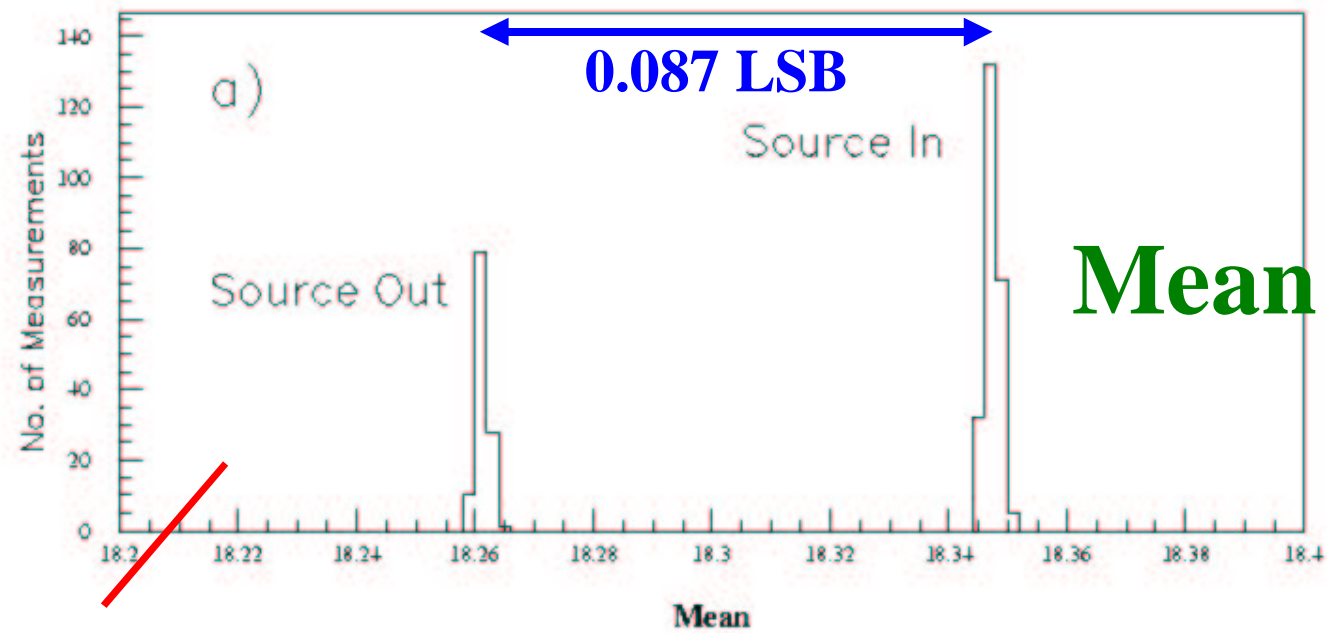
Pedestal (LC)



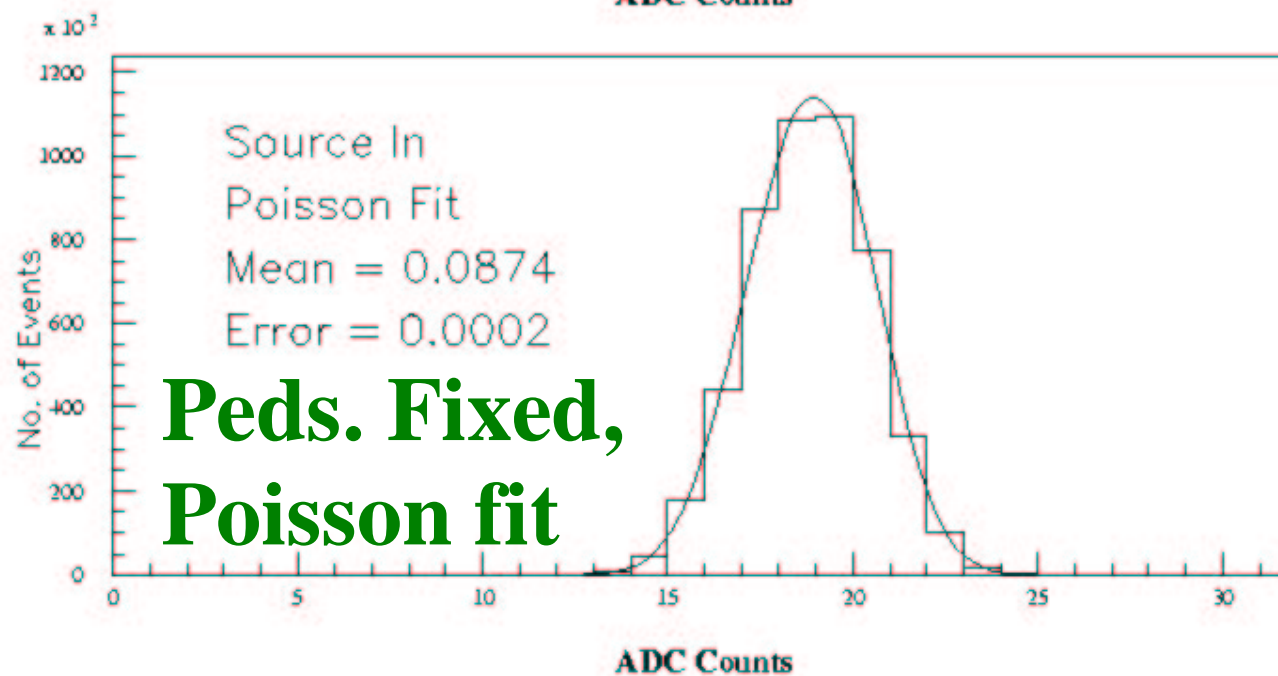
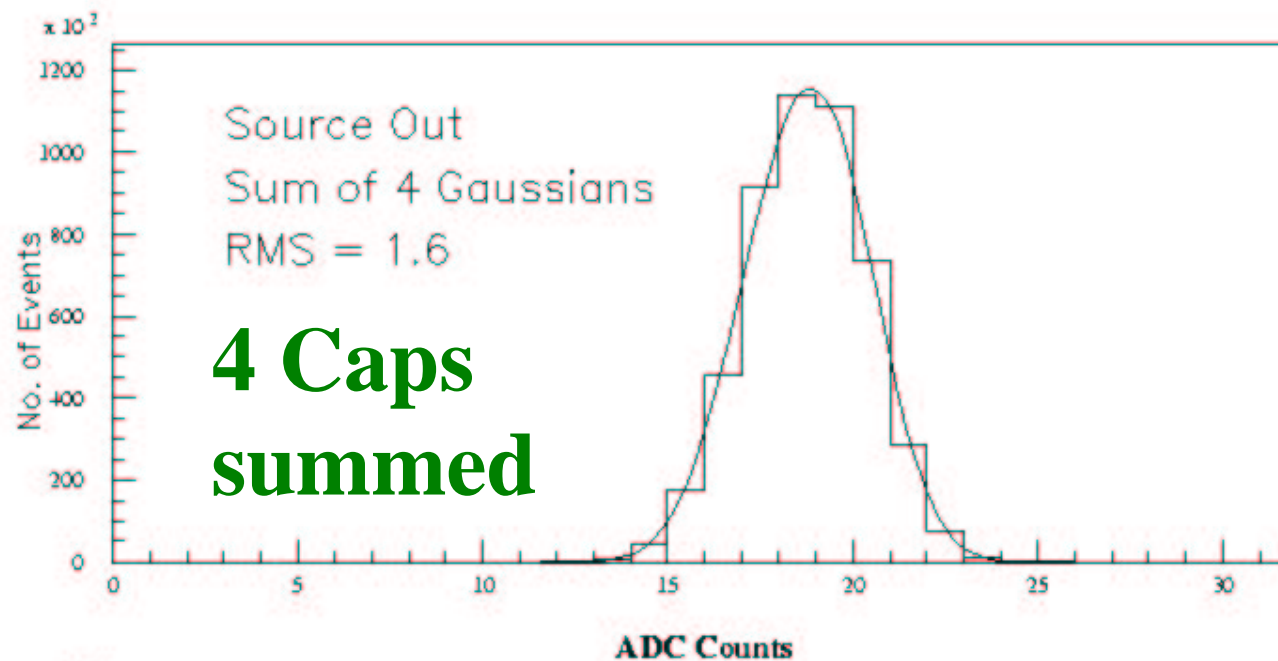
Pedestal (LC)



Pedestal (LC)



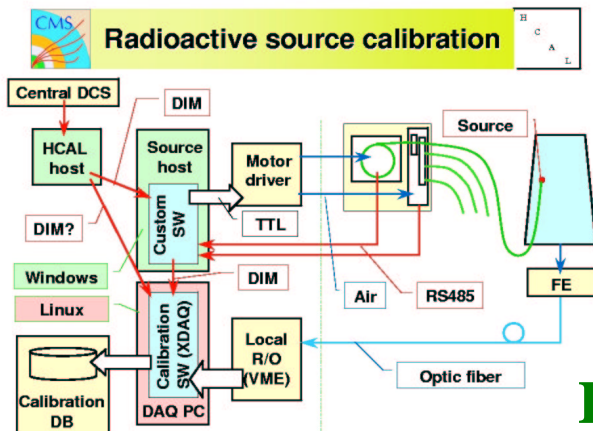
*Source Calibration,
Jan.-Mar. 2002*



*Source Calibration,
Jan.-Mar. 2002*

DCS & Calibration/Monitoring

**Cost to complete:
\$677k**



Source/Laser Calibration

Two channels read this winter with fixed source. Full wedge planned for this summer with moving source and integrated controls. Laser system stand-alone at FSU, to be integrated this Fall.

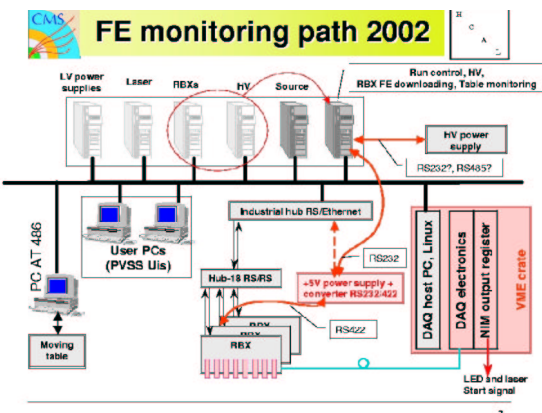
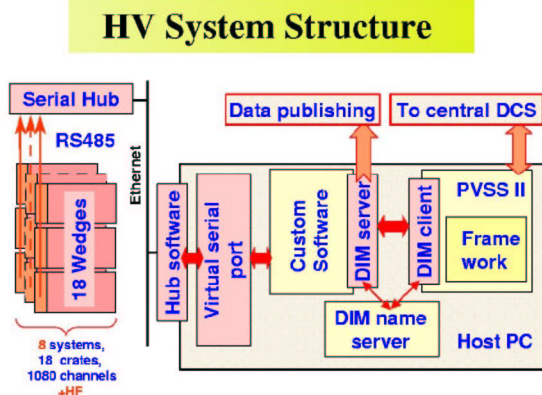
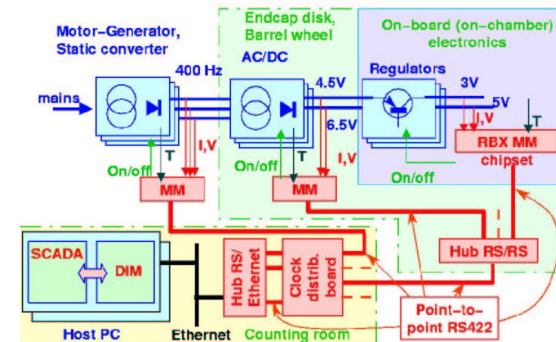
High Voltage

Control system tested with EMU supply in Dubna. To be used for testbeam 2002.

Low Voltage

400 Hz AC decided; HCAL control system could be used.

Low Voltage Control System

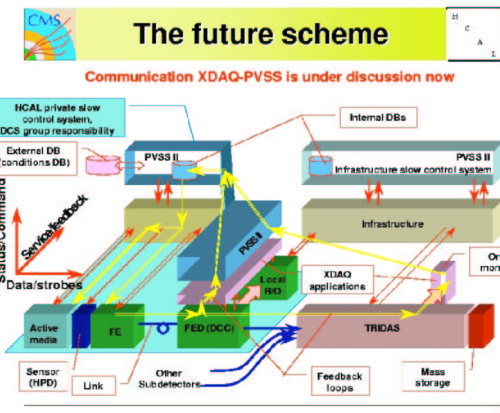


RBX

Controls to be used for testbeam 2002.

Monitoring

Local DAQ, event spy prototype this summer.





DCS Cost to Complete

2.1.9	Detector Control System (HB)	\$359,192.90
2.1.9.1	Toolkit	\$25,000.00
2.1.9.2	Field Bus	\$20,938.00
2.1.9.3	Readout Box Interface Card	\$104,572.90
2.1.9.4	TTC System	\$145,082.00
2.1.9.5	Controls Equipment	\$63,600.00
2.2.9	Detector Control System (HO)	\$88,230.00
2.3.9	Detector Control System (HE)	\$73,430.00
2.5.9	Detector Control System (HF)	\$155,840.00
TOTAL		\$676,692.90

Adequate funds have been identified to complete this work.